

CURRICULUM VITAE ABREVIADO (CVA)**Part A. INFORMACIÓN PERSONAL**

Nombre	Mario Javier		
Apellidos	Durán Martínez		
Género	Male	Fecha nacimiento	
DNI			
e-mail		https://www.researchgate.net/profile/Mj-Duran	
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A.1. Cargo actual

Position	Full Professor		
Initial date	21/12/2017		
Institution	University of Málaga		
Department/Center	Department of Electrical Engineering	School of Engineering	
Country	Spain	Teleph. number	
Key words	Electric drives, multiphase machines, predictive control, propulsion		

A.2. Previous positions

Period	Position/Institution/Country/Interruption cause
26/02/2008 to 21/12/2017	Associate Professor
14/06/2007 to 25/02/2008	Assistant Teacher
20/02/2004 to 13/06/2007	Collaborator Teacher
01/11/2001 to 19/02/2004	Research scholarship holder (FPI)

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
PhD (Electrical Engineering)	University of Málaga	2003
MsC (Mechanical Eng.)	University of Málaga	1999

Part B. CV SUMMARY (max. 5000 characters, including spaces)

1. Mario J. Duran is currently Full Professor at the University of Málaga in the Department of Electrical Engineering. He has contributed with 100 **JCR papers**, including 65 in Q1, 93 in Q1-Q2 and 57 IEEE Transactions. His research activity has generated new valuable knowledge in the field of multiphase electric drives with a high impact in the area (9935 citations, **h-index=51**, **i10-index=113**, Google Scholar).

Just to put his career in context, he contributed to the first attempt to implement a Model Predictive Control (MPC) in multiphase electric drives in 2008, receiving a prestigious Best Paper Award from IEEE TIE (<https://www.ieee-ies.org/about/awards/awards-info/183-ies-tie-best-paper-award>).

Subsequent improvements in the proposals led to another Best Paper Award in 2011 at IET Electric Power Applications Journal and a Best Researcher Award from UMA in 2014 (<https://www.laopiniondemalaga.es/malaga/2015/10/06/uma-premia-lucha-cientifica-28499270.html>).

The know-how and the expertise accumulated from 2011 onwards culminated in two special sections about multiphase electric drives (IEEE TIE 2016) and wind energy systems (IET EPA 2017) and some reference texts, including a chapter in the Wiley Encyclopedia (EEEE), two surveys in IEEE TIE and another one in IET Electric Power

Applications. The latter obtained another Best paper Award in 2018 (<https://ietresearch.onlinelibrary.wiley.com/hub/journal/17518679/homepage/prizes>).

This intensive research activity has been possible thanks to the funding received from the Spanish government in national projects (DPI2011-25396, ENE2014-52536-C2-1-R, RTI2018-096151-B-I00, PID2021-127131OB-I00 and TED2021-129558B-C21) and the extensive international activity, with 46 co-authors (36 non-spanish) and 8 research stays in some of the most prestigious institutions (Ryerson University, Liverpool JM University, Imperial College, UTFSM, University of Bologna). The international collaborations also led to the National Science Award from the Republic of Paraguay in 2022 (<https://www.una.py/premio-nacional-de-ciencias-2022-destaca-la-labor-de-investigadores-de-la-una>) and Best Paper Award in journal Machines (<https://www.mdpi.com/journal/machines/awards/2319>).

As a result of this activity, he is one of the most cited researchers according to the ranking provided by the University of Stanford (<https://elsevier.digitalcommonsdata.com/datasets/btchxktzyw/1>). He has also been responsible of the TIC-201 research group (30 out of 32 points by DEVA) and principal researcher of five national projects and one regional project.

2. Mario J. Duran has also contributed with the creation of the pioneering laboratory 3507 LII at the School of Engineering in the University of Malaga. Funded in 2011, this lab has been equipped during the last decade including two- and three-level voltage source converters with both Si and SiC switches, five, six and nine machines (both induction and permanent magnet), grid-connection through a hybrid back-to-back connection and a control system that was designed, built and patented by the group that Mario J. Duran has been leading in the last ten years.

He has also collaborated with the company EPCOS in 2 OTRI contracts, has evaluated 10 research projects from companies for ACIE and EQA. Additionally, he has provided expert training for members of companies such as ABENGOA or ENGIE, also serving as a member of the IEEE IAS Awards Committee, Associate Editor of journal IET EPA and organizer of Special Sections both in journals and conferences.

3. During this ten years, Mario J. Duran has also been involved in intensive training activities, lecturing in undergraduate (19) and Master (8) subjects, supervising Bsc and Msc Projects (30) and organizing more than 20 courses on renewable energies, Matlab and Python. He has been director of 8 PhD thesis (with another 3 ongoing), including two female researchers that successfully ended the PhD (Dra. Cristina Martin and Dra. Paula García), and he has also been supervisor of students funded with research projects (9), youth employment program (2), department collaboration (4), OTRI transfer contracts (2) and Juan de la Cierva scholarship (2). Nowadays, Mario J. Duran is the leader of a small but young and productive research group that intensively works in lab 3507 LII.
4. Apart from the numbers, research indices and awards, I would like to highlight that some of the research proposals have been groundbreaking, modifying the existing research trend. For example, the *natural fault tolerance* demonstrated that multiphase electric drives could be empowered with a fault-tolerant capability without any control. In the same manner, the use of *virtual voltage vectors* in model predictive strategies has created a new trend in the field. This and other achievements have been disseminated in numerous talks worldwide, the most recent one in the Keynote Speech at PEMC in Pilsen by Octubre 2024 (<https://ieee-pemc2024.org/mario-duran>).

C.1. Publications (10 out of 100 JCR papers, 0 out of 4 book chapters and 0 out of 5 books)

- 1) J. Carrillo-Rios, A. Gonzalez-Prieto, I. Gonzalez-Prieto, J.J. Aciego, R. Lara-Lopez, P. Mora-Moreno and **M. J. Duran**, "Reevaluating the Role of Single-Vector FCS-MPC for Multiphase Electric Drives." *IEEE Transactions on Power Electronics*, vol. 40, no. 2, pp. 3419-3429, Feb. 2025, doi: 10.1109/TPEL.2024.3490179.
- 2) A. Gonzalez-Prieto et al., "Memory-Based Model Predictive Control for Parameter Detuning in Multiphase Electric Machines," in *IEEE Transactions on Power Electronics*, vol. 39, no. 2, pp. 2546-2557, Feb. 2024, doi: 10.1109/TPEL.2023.3328427.
- 3) J. Carrillo-Ríos, I. González-Prieto, Á. González-Prieto, **M. J. Duran** and J. J. Aciego, "Long-Prediction Horizon FCS-MPC for Multiphase Electric Drives with a Selective Control Action Promotion," in *IEEE Transactions on Industrial Electronics*, vol. 71, no. 9, pp. 9982-9993, Sept. 2024, doi: 10.1109/TIE.2023.3329230.
- 4) I. González-Prieto, **M. J. Duran**, A. Gonzalez-Prieto and J. J. Aciego, "A Simple Multistep Solution for Model Predictive Control in Multiphase Electric Drives," in *IEEE Transactions on Industrial Electronics*, vol. 71, no. 2, pp. 1158-1169, Feb. 2024, doi: 10.1109/TIE.2023.3262875.
- 5) **M. J. Duran**, I. Gonzalez-Prieto, A. Gonzalez-Prieto and J. J. Aciego, "The Evolution of Model Predictive Control in Multiphase Electric Drives: A Growing Field of Research," in *IEEE Industrial Electronics Magazine*, vol. 16, no. 4, pp. 29-39, Dec. 2022, doi: 10.1109/MIE.2022.3169291.
- 6) A. González-Prieto, I. González-Prieto, A. G. Yepes, **M. J. Duran** and J. Doval-Gandoy, "On the Advantages of Symmetrical Over Asymmetrical Multiphase AC Drives With Even Phase Number Using Direct Controllers," in *IEEE Transactions on Industrial Electronics*, vol. 69, no. 8, pp. 7639-7650, Aug. 2022, doi: 10.1109/TIE.2021.3104588.
- 7) A. González-Prieto, I. González-Prieto and **M. J. Duran**, "Smart Voltage Vectors for Model Predictive Control of Six-Phase Electric Drives," in *IEEE Transactions on Industrial Electronics*, vol. 68, no. 10, pp. 9024-9035, Oct. 2021, doi: 10.1109/TIE.2020.3028812.
- 8) I. G. Prieto, **M. J. Duran**, P. Garcia-Entrambasaguas and M. Bermudez, "Field-Oriented Control of Multiphase Drives With Passive Fault Tolerance," in *IEEE Transactions on Industrial Electronics*, vol. 67, no. 9, pp. 7228-7238, Sept. 2020, doi: 10.1109/TIE.2019.2944056.
- 9) P. Garcia-Entrambasaguas, I. Zoric, I. González-Prieto, **M. J. Duran** and E. Levi, "Direct Torque and Predictive Control Strategies in Nine-Phase Electric Drives Using Virtual Voltage Vectors," in *IEEE Transactions on Power Electronics*, vol. 34, no. 12, pp. 12106-12119, Dec. 2019, doi: 10.1109/TPEL.2019.2907194.
- 10) J. J. Aciego, I. González Prieto and **M. J. Duran**, "Model Predictive Control of Six-Phase Induction Motor Drives Using Two Virtual Voltage Vectors," in *IEEE Journal of Emerging and Selected Topics in Power Electronics*, vol. 7, no. 1, pp. 321-330, March 2019, doi: 10.1109/JESTPE.2018.2883359.

C.2. Congress (5 out of 85)

- 1) J. Carrillo, **M. J. Duran**, I. González-Prieto, J. J. Aciego and Á. González-Prieto, "Model Predictive Control for Multiphase Electric Drives with Reduced-error Slope Term," 2024 IEEE 21st International Power Electronics and Motion Control Conference (PEMC), Pilsen, Czech Republic, 2024, pp. 1-6, doi: 10.1109/PEMC61721.2024.10726416.
- 2) A. González Prieto, I. González Prieto, A. Gómez Yepes, **M.J. Duran** and J. Doval-Gandoy, "Symmetrical Six-Phase Induction Machines: A Solution for Multiphase Direct Control Strategies," 22nd IEEE International Conference on Industrial Technology (ICIT2021), Valencia (Spain), 2021.
- 3) P. Salas-Biedma, I. Gonzalez-Prieto and **M. J. Duran**, "Current Imbalance Detection Method based on Vector Space Decomposition Approach for Five-Phase Induction

Motor Drives," IECON 2019 - 45th Annual Conference of the IEEE Industrial Electronics Society, 2019, pp. 975-980, doi: 10.1109/IECON.2019.8927022.

- 4) A. Gonzalez-Prieto, I. Gonzalez-Prieto and **M. J. Duran**, "Efficient Predictive Control with Natural Fault-Tolerance for Multiphase Induction Machines," IECON 2019 - 45th Annual Conference of the IEEE Industrial Electronics Society, 2019, pp. 1034-1039, doi: 10.1109/IECON.2019.8927715.
- 5) J. J. Aciego, I. Gonzalez-Prieto and **M. J. Duran**, "Control of Six-Phase Voltage Source Converters Using Dynamic Voltage Vectors," IECON 2019 - 45th Annual Conference of the IEEE Industrial Electronics Society, 2019, pp. 6200-6205, doi: 10.1109/IECON.2019.8927031.

C.3. Research projects (Principal Researcher in all of them)

- 1) Plan nacional I+D+i (Retos). Title: "Sistemas de propulsión ultra eficiente para los vehículos eléctricos del futuro". Reference: TED2021-129558B-C21. Duration: 2022-2025. Funding: 172.500,00 €. Rol: **Principal Researcher**.
- 2) Plan nacional I+D+i (Retos). Title: "Estrategias predictivas avanzadas para aumentar la eficiencia en la propulsión multifásica de vehículos eléctricos". Reference: PID2021-127131OB-I00. Duration: 2022-2025. Funding: 105.868,32 €. Rol: **Principal Researcher**.
- 3) Plan nacional I+D+i (Retos). Title: "Incremento de la fiabilidad en sistemas de energía eólica multifásicos mediante el desarrollo de una tolerancia natural al fallo". Reference: RTI2018-096151-B-I00. Duration: 2019-2021. Funding: 96.000,00 €. Rol: **Principal Researcher**.
- 4) Proyectos FEDER Junta de Andalucía. Title: "Suministro inteligente de tensión para la propulsión eficiente de vehículos eléctricos" Reference: UMA20-FEDERJA-039. Duration: 2021-2023. Funding: 22.126 €. Rol: **Principal Researcher**.
- 5) Plan nacional I+D+i (Retos). Title: "Desarrollo de sistemas eólicos multifásicos tolerantes a fallos". Reference: ENE2014-52536-C2-1-R. Duration: 2014-2018. Funding: 129.470,00 €. Rol: **Principal Researcher**.
- 6) Plan Nacional I+D+i. Title: "Análisis y desarrollo de sistemas multifásicos de conversión de la energía eólica (MWECS)", Reference: DPI2011-25396. Duration: 2012-2014. Funding: 139.150 €, Rol: **Principal Researcher**.

C.4. Contracts, technological or transfer merits

- 1) Contrato con la empresa EPCOS-TDK, titulado "Proyecto técnico para la caracterización eléctrica de condensadores de alta frecuencia para convertidores basados en **semiconductores de SiC**". Importe: 9.213,80 €. Fecha: 2018.
- 2) Contrato con la empresa EPCOS-TDK, titulado "Proyecto técnico para la liberalización de un nuevo interruptor de sobrepresión para condensadores de potencia", Importe: 18253 €. Fecha: 2016.
- 3) Contrato con la empresa ACIE, titulado "Realización de servicio de evaluación, como especialista y experto técnico, sobre recarga de vehículos eléctricos". Importe: 600 €. Fecha 2013.
- 4) Patente nacional titulada : "Módulos electrónicos y sistemas electrónicos modulares para monitorización y/o gestión o control de convertidores de potencia". Referencia: ES2558951. Fecha concesión: 08/11/2016 (patente en explotación).
- 5) Formación de profesionales, incluyendo la dirección de tesis doctorales industriales (José Ramón del Álamo, ENGIE, 2022) y la impartición de cursos de extensión universitaria sobre energía eólica o python, entre otros.